

study of the vertical atmospheric structure

The vertical structure of wind field in the upper stratosphere and mesosphere obtained by infrasound probing method is studied. The method is based on the effect of infrasound scattering from highly anisotropic wind velocity and temperature inhomogeneities in the atmosphere. The vertical wavenumber spectra and coherences of the retrieved vertical profiles of wind velocity fluctuations are obtained. Particularly, such profiles were retrieved from the signals recorded for different azimuths at a range of 100-120 km from volcanoes in Kamchatka. The infrasound propagation from volcanoes and surface explosions through the atmosphere with the retrieved profiles of the effective sound speed is modeled by using parabolic equation method. The obtained consistency between modeled and recorded infrasound signals at different ranges from the infrasound source shows that real-time retrieval of the fine-scale wind velocity structure allows us to better predict infrasound field and localize its source as compared to the case when such structure is not taken into account in the existing atmospheric models. The possibility of using retrieved wind velocity structure for improving the models of long-range infrasound propagation in the atmosphere is discussed

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